

## Quiet your noisy generator with an automobile muffler

By Jon B. Bushey

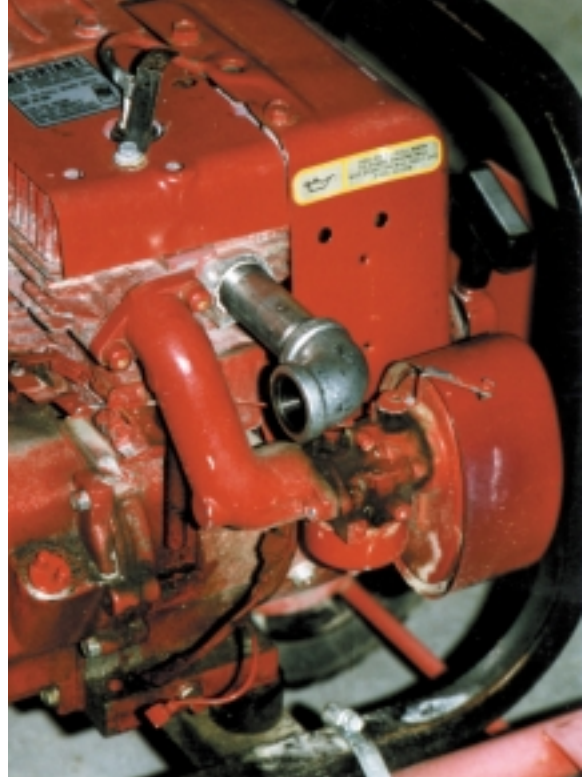
Having a cabin in a remote area of Utah, I depend upon a generator to provide electricity. I have a solar electric system, but for the high power tools I run the generator. I don't mind filling it with gas, restarting it, or even the maintenance. But the noise drives me crazy.

I have read articles in *BHM* about generator sheds to reduce noise, but I didn't want to go to that much work. Plus my generator needs to be portable as we work about the "ranch."

For a few years, I had tried to find a replacement muffler that would reduce the noise. It seemed to me the stock muffler was intended to reduce sparks—not lessen the noise. I found out later how true that was. I searched the hardware catalogs for mufflers and even ordered a few that looked promising. After trying them, I found that they too did little to quiet the engine. I visited various small engine shops and asked about "quiet mufflers." I was told again and again that the mufflers were all the same—"Just live with it."

Now, it's important to realize that this had become a quest. The more I heard that there's nothing that can be done, the more I thought that there has to be something. I searched more catalogs, called engine dealers, and rummaged part stores. Every time we had to start the generator the noise would grind on me. Not only the pulsing sound waves crushing my eardrums, but the emotional grinding of being helpless.

Determined to try anything, I sought a new fresh approach. I thought, "Okay, if the small engine dealers can't (or won't) come up with a solution, I'll try someplace else." I reasoned that the small mufflers just don't have the capacity (volume, size) to do anything about the noise. What about taking an automotive muffler and somehow hooking it up? As an engineer, I knew there could be dozens of technical challenges, not only in "hooking" the parts together, but getting them to work together effectively. And what about the metal work—I didn't have a machine shop or welder. I had nothing



*In this picture, you can see where I threaded an extra nipple into the engine. I used Teflon plumbing tape to seal the threads. The 90-degree elbow is where I will attach the nipple/connector/exhaust-pipe assembly. The muffler then slips over the assembly.*

more than hand tools. Was I getting in over my head?

At this point, if someone had told me, like I'm telling you, how simple this is, I never would have believed them. After years of research, design, trials, and errors, the job ended up taking about half an hour. And most of the half hour was running around—maybe 10 minutes of actual work.

There are two secrets that make this a dream-come-true. First, a lot of small engines, like my eight-horse Tecumseh, use NPT to thread the muffler on. Briggs & Stratton uses NPT also, but in 1/2, 3/4, or 1-inch diameter. Mine has 3/4-inch threads. Check your engine, as you will need to know the size. The second secret is that the NPT connectors used to join pipes have a little smaller outside diameter than the inside diameter of an automotive



*The finished unit*

exhaust pipe. This means that an off-the-shelf piece of pipe, threaded at one end for your engine, will slip inside a car muffler.

Now, to get the pipe and connector to mate your small engine to a car muffler, go to the hardware store and walk down the plumbing aisle. Yes, we are getting engine parts; it's just that normal people use them for plumbing. Find a "nipple" that has the diameter of your engine's muffler. As a rule of thumb, it's a 1/2-inch for 5-horse, 3/4 for 8-horse, and a 1-inch for 10-horse. You will need to get a length that will suit your engine's mounting. I got a 2 1/2-inch. I also got a 90-degree elbow because I wanted the muffler to parallel the generator. It was easier for me to support the muffler that way. You may need additional fittings to get the muffler in a position for mounting.

The final thing we need is a connector/adaptor. Use either one. The result



*The before and after connector/adapters*

we are looking for is to have one end of the pipe to be a little less than 1 3/4 inches outside diameter.

The smaller of the two shown in the photo above is the result of putting together the nipple and the connector. The other is the result of taking the two parts to a muffler shop. At the

muffler shop, I had them weld a small piece of exhaust pipe onto the outside of the connector. The connector is not visible in the larger set because it is hidden inside the exhaust pipe. While at the muffler shop get a muffler and a muffler clamp. I paid \$30 for the welding, muffler, and clamp. I also got a tail pipe and another clamp because it made it easier for me to mount the muffler.

Make sure to securely mount the muffler. Between the weight and the vibration, the threads cannot support the muffler. And, of course, the muffler will get very hot.

I did some measurements of the sound levels before and after. I just used a simple cassette recorder with a sound meter, so the results are not accurate. However, it wasn't really needed anyway—the difference in sound level is very apparent to the ear.

It turns out there is not much difference between no muffler and having one of the many small engine mufflers attached. The small engine mufflers just don't make any noticeable difference in the sound level. After hooking up the car muffler (and all the plumbing), I went to pull the rope starter and I could hardly believe the difference. It was hard to tell the engine was turning over. After a second or two, the engine powered up to speed and the noise did increase. Keep in mind that a generator runs at 1/2 to 3/4 throttle so there's going to be some noise. While the sound is still noticeable, it's much more peaceful than before. If you're curious about what your generator would sound like, you can use your vehicle as a test. Start your engine and let it idle out of gear. Next, press the accelerator until you reach about 2700 RPM. The sound your engine makes will be about the same as the generator with these modifications. If you don't have a tachometer, accelerate to about four times the hot idle, the same as going down the highway doing 55 mph. Δ

## *A country moment*



*Tony Pennucci holds his 16 3/4 pound catfish caught at Copco Lake in northern California as Jason Lemke, age 10, looks on.*